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10/580,397	02/13/2007	Robert David Banham	HAMM0012PCTUS	1955

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EXAMINER	
CARLEY, JEFFREY T.	
ART UNIT	PAPER NUMBER
3729	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,397	BANHAM ET AL.	
	Examiner	Art Unit	
	JEFFREY CARLEY	3729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 February 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8,10-14 and 16-20* is/are rejected.

7)☐ Claim(s) *7, 9 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/20/10, 06/16/06,05/24/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, claims 1-20, in the reply filed on 02/03/2011 is acknowledged.

Claims 21 and 22 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. The applicant is respectfully thanked for timely cancelling non-elected claims 21 and 22.

Claim Objections

Claim 1 is objected to because of the following informalities: on line 2 of said claim, the applicant has disclosed "having surface". Said disclosure appears to be a simple typographical error. It is the understanding of the examiner that the applicant intended to claim "having a surface". Appropriate correction is requested.

Claim 3 is objected to because of the following informalities: on line 3 of said claim, the applicant has disclosed "a upper surface". Said disclosure appears to be a simple typographical error. It is the understanding of the examiner that the applicant intended to claim "an upper surface". Appropriate correction is requested.

Claim 8 is objected to because of the following informalities: on line 3 of (e), the applicant has disclosed "though". Said disclosure appears to be a simple typographical error. It is the understanding of the examiner that the applicant intended to claim "through". Appropriate correction is requested.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 8, 16 and 18-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Alternative expressions are permitted if they present no uncertainty or ambiguity with respect to the question of scope or clarity of the claims. However, the use of "and/or" language renders the claim indefinite as it is not clear if, for example, from claim 1, the first metallic layer extends above the mask, extends above the mask and over it, or is only over the mask. Said example demonstrates three distinct methods and three different structural outcomes. As further example, in claim 8, it is not clear whether the first recesses are wider than the second recesses **and** (b) the first elongate channels are wider than the second first elongate channels, **and** (c) the first elongate channels **and** the second first elongate channels taper in width **and**(d) the direction of elongation of the first elongate channels is at non-zero angle to that of the second first elongate channels, **and**(e) the first elongate channels **and** the second first elongate channels are provided with projections, sidewall recesses **and** baffling, whereby non-linear flows though such channels may be achieved; OR, the second recesses are wider than the first; OR whether there are sidewall recesses or baffling; etc. To delineate all of the possible combinations and subcombinations of compellingly disparate and distinct processes and subsequently formed structures would be excessive and redundant, however all instances of this language are considered indefinite. As such, the claims have been examined as best understood and interpreted as detailed below.

Further, Claim 16 recites the limitation "the step of removing the object" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Further, Claim 19 recites the limitation "metallic material used in the third electroforming operation is different from metallic material used in the second electroforming operation." in lines 3-4. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 10, 13 and 16-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Dohya et al (USP 4736521), hereinafter '521.

Regarding claim 1, '521 discloses a process for the fabrication of a metallic component, comprising: providing an object (10 containing 13) having a surface; performing a first electroforming operation (plating), thereby forming a first metallic layer (16) comprising metallic material on said surface (fig. 2B; col. 3, lines 50-54); forming a first mask layer (17) on said first metallic layer, said first mask layer comprising a non-conductive material (fig. 2C; col. 4, lines 66-67); patterning said first mask layer, thereby providing a plurality of first recesses (17B) in said first mask layer from which said non-conductive material above said first metallic layer is removed, said first recesses having a dimension of elongation (width) (fig. 2D; col. 5, lines 7-9); performing second electroforming operation, whereby said first recesses are filled with metallic material and a second metallic layer (18) is formed, said second metallic layer comprising, metallic material extending at least a first predetermined thickness and or at least partially over the surface of said first mask layer (fig. 2E; col. 5, lines 15-23).

Regarding claim 2, '521 discloses the process of claim 1, wherein the object comprises: **A)** a substrate and said surface comprises a flat or substantially flat surface of the substrate (figs. 1, 2A and 2B), **or** B) a shaped mandrel, the mandrel defining said surface, the surface including at least one of cylindrical, conical, parabolic, hyperbolic, elliptical and spherical.

Regarding claim 10, '521 discloses the process of claim 1, wherein the first electroforming operation is performed such that the thickness of the first metallic layer is about 100 to 200 μm (col. 5, lines 16-22). Based on the applicant's own disclosure (Specification, page 8, lines 11-14), the thickness of the metal layer of '521 (about 20 μm) is about 100 to 200 μm.

Regarding claim 13, '521 discloses the process of claim 1, wherein said second electroforming operation is performed for an extended period, whereby the thickness of the second metallic layer is at least as large as the thickness of the first mask layer (col. 5, lines 13-14 and 20-22).

Regarding claim 16, as best understood, '521 discloses the process of claim 1, wherein the step of removing the object **and/or** removing the non-conductive material comprises dissolving said non-conductive material in a solvent **or** melting said non-conductive material (col. 5, lines 6-10; exposing and developing of polyimide would naturally be expected to include melting or a solvent).

Regarding claim 17, '521 discloses the process of claim 1, wherein the object is a metallic component (at least 13 included in 10).

Regarding claim 18, as best understood, '521 discloses the process of claim 1, wherein metallic material used in the electroforming is nickel (col. 5, lines 17-20; col. 3, lines 56-59),

copper, cupronickel, nickel containing ceramic powder, or copper containing ceramic powder, or an alloy containing iron and/or cobalt.

Regarding claim 19, as best understood, '521 discloses the process of claim 18, wherein metallic material used in the second electroforming operation is different from metallic material used in the first electroforming operation (col. 5, lines 17-20; col. 3, lines 56-59; at least gold is different from the first metallic material, nickel)

Regarding claim 20, as best understood, '521 discloses the process of claim 1, wherein the non-conductive material used in the steps of forming a first mask layer **and/or** forming a second mask layer comprises a low melting point polymer (col. 5, lines 28-31; phenol resin).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 5, 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over '521 in view of Ernstoff et al (USP 4205428), hereinafter '428.

Regarding claim 3, '521 discloses all of the elements of the current invention as detailed above. '521, however, does not teach machining said second metallic layer to form a uniformly thick second metallic layer, said second metallic layer thereby having an upper surface.

'428 teaches that it is well known to machine a metallic layer to form a uniformly thick metallic layer, said metallic layer thereby having an upper surface (col. 3, lines 24-29).

It would have been obvious to one of ordinary skill in the art to have modified the current invention of '521 to incorporate the machining of the surface of a metallic layer of '428. Both '521 and '428 disclose methods of electroforming metals; said methods being old and well known (As admitted in applicant's own disclosure: page 8, lines 8-10). It is further well known that a smooth and level surface of a metallic layer is desirable at for making further connections and for enhanced conduction of various types of energy. Still further, machining a metal layer to form a uniformly thick layer is a well known expedient in the art. To combine electroforming with machining is clearly obvious by at least the said reasons and further by the explicit disclosure of said combination steps in '428

Regarding claim 5, the modified '521 discloses the process of claim 3, further including: forming a second mask layer (17C) on the upper surface of the second metallic layer, said second mask layer comprising a non-conductive material; patterning the second mask layer, thereby providing a plurality of second recesses in the second mask layer from which the non-conductive material above the second metallic layer is removed, said second recesses having a dimension of elongation; performing a third electroforming operation using metallic material whereby said second recesses are filled with metallic material and a third metallic layer is formed comprising metallic material extending at least a second predetermined thickness above and at least partially over the surface of said mask layer (from '521: figs. 1 and 2E; col. 5, lines 24-28 and 1-23).

Regarding claim 6, the modified '521 discloses all of the elements of the current invention as detailed above. Please refer to the rejection of claim 3 to '521 in view of '428, above.

Regarding claim 11, the modified '521 discloses all of the elements of the current invention as detailed above. Modified '521 further teaches that said second electroforming operation is performed such that said predetermined thickness is at least as thick as the thickness of the first metallic layer (from '521: col. 5, lines 15-28), and (based on the rejection of claim 3 and rationale for said rejection, above) said machining step comprises machining the second metallic layer to thickness equal to or about equal to the thickness of the first metallic layer.

As '521 discloses that the two metallic layers are equal to or about equal to each other in thickness, and as it has been demonstrated to be obvious to combine the plating and machining steps of '428 with the plating of '521, it would have also been obvious to machine the second layer in the same manner as the first.

Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over '521 in view of Subramanian et al (USPG-Pub 2003/0026697 A1), hereinafter '697.

Regarding claim 3, '521 discloses all of the elements of the current invention as detailed above. '521, however, does not teach machining said second metallic layer to form a uniformly thick second metallic layer, said second metallic layer thereby having an upper surface.

'697 teaches that it is well known to machine a metallic layer to form a uniformly thick metallic layer, said metallic layer thereby having an upper surface (fig. 1D; pars. 0028, 0033).

It would have been obvious to one of ordinary skill in the art to have modified the current invention of '521 to incorporate the machining of the surface of a metallic layer of '697. Both '521 and '428 disclose methods of electroforming metals on and around masks; said methods being old and well known (As admitted in applicant's own disclosure: page 8, lines 8-10). It is further well known that a smooth and level surface of a metallic layer is desirable at for making

further connections and for enhanced conduction of various types of energy. Still further, machining a metal layer to form a uniformly thick layer is a well known expedient in the art. To combine electroforming with machining is clearly obvious by at least the said reasons and further by the explicit disclosure of said combination steps in '697.

Regarding claim 14, the '697 modified '521 further discloses that the step of forming a first mask layer comprises coating the first metallic layer with said non-conductive material to a thickness of 1-2 mm (1000 μm = 1 mm; from '697: par. 0028).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over '521 in view of the modified '521 of rejected claim 3, and further in view of Wada et al (USP 4790902), hereinafter '902.

Regarding claim 4, the '697 modified '521 discloses all of the elements of the detailed invention as detailed above. '697 modified '521 further teaches that it is well known to remove the non-conductive masking material (16) thereby producing a metallic component having first elongate channels extending therein where the non-conductive material has been removed (figs. 1C-1D; Abstract). Modified '521, however, does not teach removing the object.

'902 teaches that it is well known to remove the object (conductive carrier, 2) after the electroforming steps (figs. 2-7; col. 11, lines 30-35).

It would have been obvious to one of ordinary skill in the art to have modified the '697 modified '521 to incorporate the removing of the object of '902. Electroforming devices comprises a group of well known processes (see rejection of claim 3 above) and further it is well known that many types of electroformed devices are formed on removable or sacrificial carriers (objects). To remove a carrier is considered obvious in the art as it is known that electroforming

is often destructive to; or produces additional material on the carrier object. Therefore separating said object may be considered advantageous and would have occured to one of ordinary skill in the art at the time the invention was made.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over '521 in view of itself.

Regarding claim 12, '521 discloses all of the elements of the current invention as detailed above. '521, however, does not teach that the thickness of the first metallic layer is at least as large as the thickness of the first mask layer. However, '521 does teach repetitiously forming layers 17 and 18, more than twice. Further, '521 teaches that metallic layers 18 are at least as thick as layers 17. It would be obvious that the first metallic layer (16) may be built up at least as thick as subsequent metallic layers. Further, if an alternative interpretation of claim 1 is presented, and if the first metallic layer is considered to be analogous to the first applied metallic layer (18), then the subsequent several metallic layers are also the same heights.

Allowable Subject Matter

Claim 7, 9 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim (once the 35 U.S.C. 112 deficiencies of claim 1 are remedied) and including all of the limitations of any intervening claims.

Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim (once the 35 U.S.C. 112, 2nd par deficiencies of claim 1 are remedied), once the 35 U.S.C. 112, 2nd par

deficiencies of claim 8 are remedied, and including all of the limitations of any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY CARLEY whose telephone number is (571)270-5609. The examiner can normally be reached on Monday through Thursday 8:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Derris Banks can be reached on (571)272-4419. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. Dexter Tugbang/
Primary Examiner
Art Unit 3729

/JTC, AU 3729/

March 27, 2011